Time Management Update
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Summary

- Version 0.3 of time management document out, draft of V 1.0 by 7/31/96
- TM group meeting 7/16/96
- additional time management services
  - time advance
  - optimistic time management services
- interaction between time and declaration management
- baseline definition and evolution

New Time Management Services

Current Definition:

- federates learn of logical time advances via **Time Advance Grant** service (e.g., in response to **Next Event Request** service).

Requirement:

- federates would like to know of intermediate logical time advances (prior to **Time Advance Grant**)

Recommended Resolution:

- Federates may read LBTS (lower bound on time stamp of subsequent time stamp ordered messages) from the local RTI
- Option to **Next Event Request** where RTI invokes “intermediate time advance grants” as available prior to final **Time Advance Grant**

Optimistic Time Management Services

Goal: support inclusion of rollback-based federates (e.g., Time Warp parallel simulation) in the RTI; includes mixture of optimistic and conservative (non-rollback based) federates

Requirements:

- optimistic federate must be able to receive time stamp ordered (TSO) messages, even if the RTI cannot guarantee order
- see time management document for further details

Recommended Resolution: Two new services

- **Flush Queue Request (T)**
  - similar to **Next Event Request** except release *all* messages stored in RTI queues to the federate
  - advances logical time of the optimistic federate
- **Flush Queue Grant (T')**
  - indicates completion of operation
  - logical time advance to time T' (used for fossil collection)

Declaration Management and Time Management

Issue: What are the semantics of data subscription and unsubscription mechanisms with respect to time?

Approaches:

- Real-time based: subscribe/unsubscribe take effect “as soon as possible”
  - currently implemented in RTI
  - suitable for non-logical time based federations (e.g., training)
- Logical-time based: subscribe/unsubscribe takes effect at a specific point in logical time
  - federate level approach (Steinman)
  - RTI level approach (Fujimoto)

Recommended Resolution: Baseline includes real-time based approach. Longer term, a logical time based approach should be provided for (e.g.) analytic federates.

Baseline Definition: What's included?

- message order: include receive and time stamp order *only*
- time advance mechanisms: include **Next Event Request, Time Advance Request,** and **Time Advance Grant**
- optimistic time management: include **Flush Queue Request** and **Flush Queue Grant**
- real-time based declaration management

Baseline Definition: How does it change?

Process

- Time Management document contains official definition of HLA time management services
- time management working group defined (DMSO)
- time management working group prepares recommendations concerning changes to services, longer term vision
- recommended changes approved/disapproved by AMG

Criteria: suggested changes should

- provide significant new functionality that cannot be reasonably implemented with existing services, or enable significant performance enhancements to existing services
- have a reasonably efficient implementation approach defined
- be applicable to a reasonably broad class of actual or envisioned simulations, and
- have application to specific DoD simulation(s) either in existence or under development